



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

Reply To
Attn Of: OEA-095

October 31, 2002

MEMORANDUM

SUBJECT: Review of the Portland Harbor RI/FS Round 1 Quality Assurance Project Plan (QAPP) Revision: October 11, 2002

FROM: Ginna Grepo-Grove, Chemist, QA Office, OEA
Dana Davoli, Senior Human Health Risk Assessment, OEA
Julie Wroble, Human Health Risk Assessment, OEA

TO: Wallace Reid, EPA Project Manager
Tara Karamas, EPA Project Manager
Chip Humphrey, EPA Project Manager
Office of Environmental Clean-up

The review of the QA document referenced above has been completed. The document was prepared by Striplin Environmental Associates, Inc. (SEA) according to the agency required EPA/R5 QA document, "EPA Requirements for Quality Assurance Project Plans", Final version EPA/240/B-01/001, March, 2001.

In general, the reviewers find this revision to be very well written and organized. This plan addressed most of the issues and concerns that EPA stipulated in the August 1, 2002 memo. A final approval will be granted upon receipt and review of the following:

1. There are quite a few parameters in the revised QAPP whose MRLs are still tentative. Please submit a copy of the final MDLs conducted by the labs to initially demonstrate the laboratory's capability per matrix, per instrument and per suite of parameters to EPA.

Because ARI and CAS will serve as back-up lab for each other, MDLs for both sediment and tissue matrices from both labs must be submitted. Triangle Labs, the back-up lab for AXYS, must submit their SOPs and MDLs for both tissue and sediment samples for Congener Biphenyls and PCDD/PCDF analyses before they conduct any analyses.



2. In EPA's previous comments on the QAPP (August 1, 2002 memo) the following request was included:

"Section 2.1 page 15 (Purpose/Background) - Because the sampling scheme for this project relies heavily on the existing historical data, especially the sediment data, the QA Summary Reports (which include QC sample results) of each survey or sampling event should be submitted to EPA for further QA review and assessment."

Because the design for future sediment sampling may rely on these data, we request that these QA Summary Reports be submitted to EPA by the end of December, 2002.

3. Address the following concerns in the revision of the QAPP:

- section A7.2 - The DQOs that were developed and presented in the RI/FS Workplan are presented in Appendix F of the QAPP. The DQOs in Appendix F of the QAPP should be considered to be drafts until the final DQOs are approved for the Workplan.
- section B4.1.6 Metals - Sediment and Tissue - Some of the target analytes (silver, arsenic, cadmium, lead, antimony and selenium for sediment; selenium for tissue) will be analyzed following GFAA methods. Add Method 7000's in this section. M. 7471 is a mercury method discussed in the next sub-section. Remove M.7471 from section B4.1.6.
- section B4.1.7.2 SVOC bullet number 2 - Gel Permeation Chromatography is a clean-up technique utilized to remove high molecular weight hydrocarbons, lipids and sulfur that are very likely to interfere with the analysis. GPC clean-up must be required for tissue and sediment analyses. Note: If the lipid content for the sample is greater than 10%, the extract will need to undergo GPC clean-up twice.
- section B4.1.7.2 SVOC bullet number 4 - GC/MS SVOC initial calibration will have a 7 - point calibration curve, at least one of the low standard must be at the project required MRL or the lab will need to run a daily MRL check .
- section B4.1.7.3 Chlorinated Pesticides and PCBs bullet number 2 - The laboratory has to ensure that break through and chromatographic column overload during the clean-up process for pesticides, PCBs and PAHs does not occur.
- section B5.1.3 Replicate Samples for Sediment. The text here and in section B.5.1.5 needs to be updated to reflect a 10% field replicate rate for the co-located sediment, crayfish, and sculpin samples.

- section B5.1.7a - If the field equipment blanks or rinsates will only be analyzed in case of suspicion of equipment cross contamination, holding time may be missed. Besides, if an IDW is generated in the field, it is recommended that a rinsate blank be collected for analysis.
- section B5.1.7b - Field Laboratory Equipment blanks - This section is confusing. This section refers to laboratory equipment blanks (proof) and another “blank for field laboratories (filter)”. Please discuss these blanks further.
- section B5.2.2 Method Reporting Limit Check - The following sentences are not clear “a daily MRL check sample will be run. The lab may forgo this analysis if their lowest standard is at the project specified MRL and is analyzed at the beginning of the run”, please clarify and re-phrase- for example: “If the lowest standard at the project specified MRL is included in the initial calibration curve, the laboratory has the option not to analyze the daily MRL check standard. Otherwise, an MRL check standard must be analyzed per analytical sequence”.
- section B5.2.4 - Laboratory Duplicates - Analytical duplicates are used to determine variabilities due to sample homogeneity. It is also used to check laboratory precision and ability to reproduce results. Please clarify: All of the organic extractable analyses will analyze laboratory designated matrix spike and matrix spike duplicate (MS/MSD) and all inorganic and conventional analyses will analyze analytical duplicates. Frequency of analysis for this QC sample is 5%.
- section B5.2.6 - Laboratory Control Samples - The results from LCS and LCSD analyses are evaluated differently from the standard reference material (SRM). Therefore, SRMs cannot take the place of LCS and LCSD. SRMs may be an option depending on its availability but LCS/LCSD analysis for extractables and LCS for metals must be analyzed per batch of samples prepared for analysis.
- section B5.2.7 and 8 - It is recommended that these two sections be combined. For organic analyses, matrix spike and matrix spike duplicate are analyzed and used to assess precision and accuracy. The spike recoveries are calculated to determine accuracy and the relative percent differences (RPD) are calculated between MS and MSD results to determine precision. For inorganic analyses, only the matrix spike is analyzed.
- section B7.1a - Calibration Standards - Documentation of the standards' traceability to NIST must also be provided by the lab.

- section B10.1 Data Reporting - second paragraph page 41. Please clarify that EPA will receive the final data in an electronic format compatible with Query Manager.
- section B10.1 Data Reporting - Last paragraph page 42: If data validation will be included in this section, it should be noted that the term level 2 validation is no longer recommended for use by EPA Region 10. Data validation can either be full or partial. Full data validation is an assessment of 100% of the data package submitted by the laboratory. This will include all of the QC summary forms, sampling and sample processing documentation and raw data generated from the analysis of samples, QC samples, calibration and check standards. Partial data validation is data quality assessment conducted based on the tabulated sample results and all QC summary forms. All of the data generated from this sampling event will either be fully or partially validated. Percentage of data that will undergo full data validation will be decided by EPA after the EPA QA Office's full data validation of the first 5% of the data.
- Table A7-1 Organic QA/QC Sample Analyses Procedures - Change footnote number 8. Instrument Blanks are analyzed at a frequency specified in the method or SOP or after a sample with high concentrations of target analyte to avoid carry-over.

Initial Calibration (ICAL) - from the CCV column, move footnote number 13 to the ICAL column. Add the % RSD requirements for herbicides and pesticides. DDT and endrin percent breakdowns should also be determined to assess the status of the GC injection system.

Continuing Calibration Verification (CCV) - remove footnote number 13 in this column. Add the %D and/or RPD requirements for pesticides and herbicides in footnote number 14.

Metals - Instrument Blanks are analyzed after the initial calibration verification (ICV) standard and after each continuing calibration verification standard (CCV).

Add GFAA (for silver, arsenic, cadmium, lead, antimony and selenium in sediment samples and for selenium in tissue samples). All of the QC in Table A7-1 applies to GFAA. State that all of the GFAA runs are double runs/injections except for the Method Standard Additions (MSA). %RSD between burns must be within the method's acceptable limits. If %RSDs are not met, sample will require re-analysis. Also state that analysis of analytical spike is required for all GFAA runs including LCS and method blanks to determine if matrix effects are occurring during analysis and to determine if MSA will be required for

quantitation. The spike recovery requirements are based on the concentration results and analysis protocol.

Note 1: GFAA analytical spikes are different from the matrix spike QC sample analysis.

Note 2: Selenium in tissue samples will be analyzed by CAS using GFAA. Section 12.5.2 of the CAS SOP No. Met-GFAA, however, states that only one post digestion spike every 10 samples or new sample batch, whichever is most frequent will be analyzed. In addition, MSA is not mentioned at all in this CAS SOP.

It is recommended that analytical spikes be analyzed for all GFAA runs. ARI includes the analysis of analytical spikes GFAA. It is recommended that LWG require CAS to analyze analytical spikes for GFAA analyses and interpret the results as specified in Exhibit E section V number 13 pages E28- E31 of the CLP Statement of Work ILM04.1.

- Those chemicals in Tables A7-4 and A7-5 that do not have ACGs are indicated by either an asterisk (*), an NE, or by using the MRL for that chemical. To make these tables easier to read and for consistency, we suggest that an asterisk be used for those chemicals without ACGs.

Some of the ACGs in Tables A7-4 and A7-5 are incorrect. A hard copy of these tables with the corrected values are enclosed. Of particular concern is that (1) the ACG of 0.01 ppt for PCB 126 in sediments provided as ACGs in EPA's August 1, 2002, QAPP comments is not included in Table A7-4 (a detection limit of 0.5 to 1.0 ppt is listed in the Table), and; (2) the 0.03 ppt for PCB 126 in biota provided as ACGs in EPA's August 1, 2002, QAPP comments is not included in Table A7-5 (a detection limit of 0.1 is listed in the Table). We feel that the biota MRL is acceptable but would like to have the Congener Biphenyl MRLs for sediment lowered if possible by extraction of a larger volume of sample and/or adjustment of the injection or final volume.

- Table A7-4 footnote d. Add that "Sample amount, final extract volume and injection size adjustments will be made by the laboratory to get the MRLs closer to the ACGs." The laboratory must conduct and submit MDL studies with the final MRLs per instrument, per matrix and per suite of parameters. No sample analysis will be conducted until the MDLs had been submitted and approved by EPA.

- Table A7-5 footnote a. In the footnotes, there is a definition but no footnote number designation (should it be assumed as footnote “a”). Please correct.
- Table B2-1. The tissue amount for PCBs has a footnote of “6” but there is no such footnote at the bottom of the table.

4. Miscellaneous issues:

- section A4.1- Add Gina Grepo-Grove to technical staff ; “Goulet” not “Goulet”

Should you have any question regarding this review, please don't hesitate to give us a call: Dana Davoli @ 553-2135; Julie Wroble @ 553-1079 for human health issues and Ginna Grepo-Grove @ 553-1632 for QA issues. Thank you.

TRANSACTION REPORT

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Sent to Janet Cloutier

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DRAFT Round 1 Quality Assurance Project Plan
October 11, 2002

| | |
|---------------------------------|-----------------------------|
| NSMITTAL | From: <i>Janet Cloutier</i> |
| 10/29-101 | Phone: <i>503-3163</i> |
| | Fax # |
| GENERAL SERVICES ADMINISTRATION | |

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| Job# | Analytical Method | MRL ¹ | ACG ¹ | CAS ² |
|--------------------------------|-------------------|------------------|------------------|------------------|
| See QAPP for guidance | | | | |
| Liquidation CAS Initiative SOP | | 1% | NE | NA |
| SW846-6013 ICP-MS (MET-6023) | MEAS w/w (ppb) | 0.01 | 0.089 | 7782-49-2 |
| SW846-6013 ICP-MS (MET-6023) | D | 0.1 | 0.027 | 7429-90-3 |
| SW846-6013 ICP-MS (MET-6023) | DJ | 0.01 | 0.027 | 7440-66-6 |
| SW846-6013 ICP-MS (MET-6023) | 0.01 | 0.01 | 7440-43-9 | |
| SW846-6013 ICP-MS (MET-6023) | 0.1 | 0.054 | 7440-47-3 | |
| SW846-6013 ICP-MS (MET-6023) | 0.02 | 0.007 | 7440-50-8 | |
| SW846-6013 ICP-MS (MET-6023) | 0.01 | 0.11 | | |
| SW846-6013 ICP-MS (MET-6023) | 0.04 | 0.36 | 7440-50-8 | |
| SW846-6013 ICP-MS (MET-6023) | 0.004 | 0.004 | 7439-92-1 | |
| SW846-6013 ICP-MS (MET-6023) | 0.004 | 0.004 | 7440-26-0 | |
| SW846-6013 ICP-MS (MET-6023) | 0.2 | 0.001 | 7782-49-2 | |
| SW846-6013 ICP-MS (MET-6023) | 0.004 | 0.004 | AGGs | |
| SW846-6013 ICP-MS (MET-6023) | 0.1 | 2.4 | 7440-66-6 | |
| SW846-7471A CVAA (MET-7471A) | 0.004 | 0.005 | 7439-97-6 | |
| SOC-BUTYL | MEAS w/w (ppb) | 2.0 | 2.0 | 78753-54-9 |
| SOC-BUTYL | 2.0 | 2.0 | 1012-52-5 | |
| SOC-BUTYL | 10 | 10 | 56573-85-4 | |
| SOC-BUTYL | | | 1461-25-2 | |
| SOC-SOB2A | MEAS w/w (ppb) | 2.0 | Q31 | 12674-11-2 |
| SOC-SOB2A | 4.0 | Q31 | 11104-29-2 | |
| SOC-SOB2A | 2.0 | 0.21 | 11141-16-5 | |
| SOC-SOB2A | 2.0 | 0.21 | 533469-21-9 | |
| SOC-SOB2A | 2.0 | 0.21 | 12672-29-6 | |
| SOC-SOB2A | 2.0 | 0.21 | 11097-69-1 | |
| SOC-SOB2A | 10 | 0.21 | 11056-82-5 | |
| SOC-SOB31 | MEAS w/w (ppb) | 1.0 | * | 51-19-0 |
| SOC-SOB31 | 1.0 | * | * | 3424-32-6 |
| SOC-SOB31 | 1.0 | * | * | 789-02-6 |
| SOC-SOB31 | 1.0 | 5.4 | 72-54-3 | |
| SOC-SOB31 | 1.0 | 3.8 | 58-89-9 | |
| SOC-SOB31 | 1.0 | 3.8 | 319-86-3 | |
| SOC-SOB31 | 1.0 | 3.8 | 5103-74-2 | |
| SOC-SOB31 | 1.0 | 3.8 | 5103-71-9 | |
| SOC-SOB31 | 1.0 | 0.74 | 2653D-43-8 | |

Janet, here's the original copy of ACGs. She said that she may be done with the list of sample locations + parameters by tomorrow or Wednesday - please send me an e-mail where can i send it, so that you may be able to use it for the Wednesday meeting.

Janet

Table A7-5 Tissue - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology

| Analytics | Extraction SOPs | Clean Ups SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|----------------------------------|--------------------|----------------|----------------------|------------------------------|------------------|------------------|------------|
| Conventional | | | | | | | |
| Lipids | SOC-LIPID | | | See QAPP for guidance | 1% | NE | NA |
| Total Solids | | | | Lyphosation CAS inhouse SOP | 0.01 % | NE | NA |
| Metals | | | | | | | |
| Silver - Ag | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.004 | 0.089 | 7782-49-2 |
| Aluminum - Al | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.1 | * 0.1 | 7429-90-5 |
| Arsenic - As | GEN-TISP MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.1 | 0.0027 | 7440-66-6 |
| Cadmium - Cd | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.01 | 0.01 | 7440-43-9 |
| Chromium - Cr | GEN-TISP, MET-TDIG | | | SW846-6010B ICP (MET-6010) | 0.1 | 0.054 | 7440-47-3 |
| Copper - Cu | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.02 | 0.67 | 7440-50-8 |
| Manganese - Mn | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.01 | 0.431 | |
| Nickel - Ni | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.04 | 0.36 | 7440-50-8 |
| Lead - Pb | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.004 | * 0.004 | 7439-92-1 |
| Antimony - Sb | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.004 | * 0.004 | 7440-36-0 |
| Selenium - Se | GEN-TISP, MET-TDIG | | | SW846-7740 GFAA (MET-GFAA) | 0.2 | X 0.001 | 7782-49-2 |
| Thallium - Tl | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.004 | X 0.001 | |
| Zinc - Zn | GEN-TISP, MET-TDIG | | | SW846-6020 ICP-MS (MET-6020) | 0.1 | 5.4 | 7440-66-6 |
| Mercury - Hg | MET-7471A | | | SW846-7471A CVAA (MET-7471A) | 0.004 | 0.005 | 7439-97-6 |
| Butyltins | | | | | | | |
| Monobutyltin | SOC-OSWT | SOC-3630 | | SOC-BUTYL | 20 | * 20 | 78763-54-9 |
| Dibutyltin | SOC-OSWT | SOC-3630 | | SOC-BUTYL | 20 | * 20 | 1002-53-5 |
| Tributyltin | SOC-OSWT | SOC-3630 | | SOC-BUTYL | 20 | 5.4 | 56573-85-4 |
| Tetrabutyltin | SOC-OSWT | SOC-3630 | | SOC-BUTYL | 10 | * 10 | 1461-25-2 |
| PCBs Aroclors | | | | | | | |
| Aroclor 1016 | EXT-3540 | EXT-FLOR | SOC-3665 & SOC-3640A | SOC-8082A | 20 | 0.21 | 12674-11-2 |
| Aroclor 1221 | EXT-3540 | EXT-FLOR | SOC-3665 & SOC-3640A | SOC-8082A | 40 | 0.21 | 11104-28-2 |
| Aroclor 1232 | EXT-3540 | EXT-FLOR | SOC-3665 & SOC-3640A | SOC-8082A | 20 | 0.21 | 11141-16-5 |
| Aroclor 1242 | EXT-3540 | EXT-FLOR | SOC-3665 & SOC-3640A | SOC-8082A | 20 | 0.21 | 53469-21-9 |
| Aroclor 1248 | EXT-3540 | EXT-FLOR | SOC-3665 & SOC-3640A | SOC-8082A | 20 | 0.21 | 12672-29-6 |
| Aroclor 1254 | EXT-3540 | EXT-FLOR | SOC-3665 & SOC-3640A | SOC-8082A | 20 | 0.21 | 11097-69-1 |
| Aroclor 1260 | EXT-3540 | EXT-FLOR | SOC-3665 & SOC-3640A | SOC-8082A | 20 | 0.21 | 11096-82-5 |
| ORGANOCHLORINE PESTICIDES | | | | | | | |
| 2,4'-DDD | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * | 53-19-0 |
| 2,4'-DDE | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * | 3424-82-6 |
| 2,4'-DDT | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * | 789-02-6 |
| 4,4'-DDD | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 5.4 | 72-54-8 |
| 4,4'-DDE | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 3.8 | 72-55-9 |
| 4,4'-DDT | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 3.8 | 50-29-3 |
| Total DDT | | | | | | * | |
| Aldrin | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 0.025 | 309-00-2 |
| a - BHC | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 0.067 | 319-84-6 |
| b - BHC | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 0.233 | 319-85-7 |
| g - BHC (Lindane) | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 0.322 | 58-89-9 |
| d - BHC | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * | 319-86-8 |
| g - Chlordane | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 0.74 | 5103-74-2 |
| a - Chlordane | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * 0.74 | 5103-71-9 |
| oxy chlordane | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * 0.74 | 26880-48-8 |

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Table A7-5 Tissue - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology

| Analytes | Extraction SOPs | Clean Ups SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|---|-----------------|----------------|----------------|-------------------|------------------|------------------|------------|
| cis - nonachlor | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | ✓ 0.74 | 5103-73-1 |
| trans - nonachlor | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | ✓ 0.74 | 39765-80-5 |
| total Chlordane ³ | | | | | 50 | 37 | |
| Dieldrin | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 0.026 | 60-57-1 |
| Endosulfan I | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 108 | 959-98-8 |
| Endosulfan II | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * | 33213-65-9 |
| Endosulfan sulfate | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * | 1031-07-8 |
| Endrin | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | ✓ 5.4 | 72-20-8 |
| Endrin aldehyde | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * | 7421-93-4 |
| Endrin ketone | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | * | 53494-70-5 |
| Heptachlor | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 0.0933 | 76-44-8 |
| Heptachlor epoxide | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 0.046 | 1024-57-3 |
| Hexachlorobenzene | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 0.26 | 118-74-1 |
| Hexachlorobutadiene | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | NE ^b | ✓ 5.4 | 87-68-3 |
| Hexachloroethane | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | NE ^b | 18 | 67-72-1 |
| Methoxychlor | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | ✓ 90 | 72-43-5 |
| Mirex | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 10 | 3.6 | 2385-85-5 |
| Toxaphene | EXT-3540 | EXT-FLOR | SOC-3640A | SOC-8081 | 50 | 0.38 | 8001-35-2 |
| SEMITOLATILE ORGANIC COMPOUNDS Full Scan | | | | | | | |
| 1,2,4-Trichlorobenzene | 340S | 371S (Alumina) | | SW846-8270C | 200 | * | 120-82-1 |
| 1,2-Dichlorobenzene | 340S | 371S (Alumina) | | SW846-8270C | 200 | 1620 | 95-50-1 |
| 1,3-Dichlorobenzene | 340S | 371S (Alumina) | | SW846-8270C | 300 | * | 541-73-1 |
| 2,2'-oxybis(1-chloropropane) | 340S | | | SW846-8270C | 300 | * | 108-60-1 |
| 2,4-Dimrotoluene | 340S | 371S (Alumina) | | SW846-8270C | 500 | * | 121-14-2 |
| 2,6-Dimrotoluene | 340S | 371S (Alumina) | | SW846-8270C | 500 | * | 606-20-2 |
| 2-Chloronaphthalene | 340S | | | SW846-8270C | 200 | * | 91-58-7 |
| 2-Nitroaniline | 340S | | | SW846-8270C | 500 | * | 88-74-4 |
| 3,3'-Dichlorobenzidine | 340S | | | SW846-8270C | 500 | * | 91-94-1 |
| 3-Nitroaniline | 340S | | | SW846-8270C | 500 | * | 99-09-2 |
| 4-bromophenyl-phenyl ether | 340S | 371S (Alumina) | | SW846-8270C | 100 | * | 101-55-3 |
| 4-Chloroaniline | 340S | 371S (Alumina) | | SW846-8270C | 300 | * | 106-47-8 |
| 4-Chlorophenyl-phenyl ether | 340S | 371S (Alumina) | | SW846-8270C | 100 | * | 7005-72-3 |
| 4-Nitroaniline | 340S | | | SW846-8270C | 500 | * | 100-01-6 |
| Aniline | 340S | | | SW846-8270C | 200 | * | 62-53-3 |
| Benzoic Acid | 340S | | | SW846-8270C | 1000 | 72000 | 65-85-0 |
| Benzyl Alcohol | 340S | | | SW846-8270C | 600 | ✓ 5400 | 100-51-6 |
| Bis-(2-chloroethoxy) methane | 340S | | | SW846-8270C | 100 | * | 111-91-1 |
| Bis-(2-chloroethyl) ether | 340S | 371S (Alumina) | | SW846-8270C | 200 | * | 111-44-4 |
| Hexachlorobenzene | 340S | 371S (Alumina) | | SW846-8270C | 100 | ✓ 0.26 | 118-74-1 |
| Hexachlorobutadiene | 340S | 371S (Alumina) | | SW846-8270C | 200 | ✓ 5.4 | 87-68-3 |
| Hexachlorocyclopentadiene | 340S | | | SW846-8270C | 500 | * | 77-47-4 |
| Isophorone | 340S | | | SW846-8270C | 200 | * | 78-59-1 |
| Nitrobenzene | 340S | 371S (Alumina) | | SW846-8270C | 400 | * | 98-95-3 |
| n-Nitrosodiphenylamine | 340S | | | SW846-8270C | 200 | * | 86-30-6 |
| Phenols | | | | | | | |
| 2,4,5-trichlorophenol | 340S | | | SW846-8270C | 500 | 1800 | 95-95-4 |
| 2,4,6-trichlorophenol | 340S | 371S (Alumina) | | SW846-8270C SIM | 500 | 117 | 88-06-2 |
| 2,4-Dichlorophenol | 340S | 371S (Alumina) | | SW846-8270C SIM | 400 | 54 | 120-83-2 |

Table A7-5 Tissue - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology

| Analytes | Extraction SOPs | Clean Ups SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|---|-----------------|------------------------|----------------|-------------------|------------------|------------------|------------|
| 2,4-Dimethylphenol | 340S | | | SW846-8270C | 200 | * | 105-67-9 |
| 2,4-Dinitrophenol | 340S | | | SW846-8270C | 1000 | * | 51-28-5 |
| 2-Chlorophenol | 340S | 371S (Alumuna) | | SW846-8270C SIM | 300 | 90 | 95-57-8 |
| 2-Methylphenol | 340S | | | SW846-8270C | 600 | * | 95-48-7 |
| 2-Nitrophenol | 340S | | | SW846-8270C | 500 | * | 88-75-5 |
| 4,6-Dinitro-2-Methylphenol | 340S | | | SW846-8270C | 1000 | * | 534-52-1 |
| 4-Chloro-3-methylphenol | 340S | | | SW846-8270C | 200 | * | 59-50-7 |
| 4-Methylphenol | 340S | 371S (Alumuna) | | SW846-8270C SIM | 600 | 90 | 106-44-5 |
| 4-Nitrophenol | 340S | | | SW846-8270C | 600 | * | 100-02-7 |
| Phenol | 340S | | | SW846-8270C | 300 | 10800 | 108-95-2 |
| Tetrachlorophenol (2,3,4,5 and 2,3,5,6) | 340S | | | SW846-8270C | NE | 540 | 58-90-2 |
| Phthalate esters | | | | | µg/kg ww (ppb) | µg/kg ww (ppb) | |
| bis(2-Ethylhexyl) phthalate | 340S | 371S (Alumuna) | | SW846-8270C SIM | 200 | 30 | 117-81-7 |
| Butylbenzylphthalate | 340S | | | SW846-8270C | 800 | 3600 | 85-68-7 |
| Diethylphthalate | 340S | | | SW846-8270C | 100 | * | 84-66-2 |
| Dimethylphthalate | 340S | | | SW846-8270C | 100 | 180,000 | 131-11-3 |
| Di-n-butylphthalate | 340S | | | SW846-8270C | 200 | 1800 | 84-74-2 |
| Di-n-octylphthalate | 340S | | | SW846-8270C | 100 | 360 | 117-84-0 |
| SEMOVOLATILE ORGANIC COMPOUNDS SIMs | | | | | µg/kg ww (ppb) | µg/kg ww (ppb) | |
| 1,2-diphenylhydrazine ^d | 340S | | | SW846-8270C | 200 | 0.16 | |
| 1,4-Dichlorobenzene | 340S | | | SW846-8270C | 200 | 17 | 106-46-7 |
| Hexachloroethane | 340S | | | SW846-8270C | 200 | 18 | 67-72-1 |
| n-Nitrosodimethylamine | 340S | | | SW846-8270C | 200 | 0.025 | 62-75-9 |
| n-Nitroso-di-n-propylamine | 340S | | | SW846-8270C | 300 | 0.18 | 621-64-7 |
| Pentachlorophenol | 340S | | | SW846-8270C | 500 | 3.5 | 87-86-5 |
| PAHs | | | | | µg/kg ww (ppb) | µg/kg ww (ppb) | |
| 2-Methylnaphthalene | 340S | | | SW846-8270C | 100 | * | 91-57-6 |
| Acenaphthene | 340S | | | SW846-8270C | 100 | 1080 | 83-32-9 |
| Acenaphthylene | 340S | | | SW846-8270C | 100 | * | 208-96-8 |
| Anthracene | 340S | | | SW846-8270C | 200 | 5400 | 120-12-7 |
| Benzo(a)Anthracene | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 0.575 | 56-55-3 |
| Benzo(a)Pyrene | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 0.0575 | 50-32-8 |
| Benzo(b)Fluoranthene | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 0.575 | 205-99-2 |
| Benzo(g,h)Perylene | 340S | | | SW846-8270C | 200 | * | 191-24-2 |
| Benzo(k)Fluoranthene | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 5.75 | 207-08-9 |
| Carbazole | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 21 | 86-74-8 |
| Chrysene | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 58 | 218-01-9 |
| Dibenz(a,h)Anthracene | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 0.0575 | 53-70-3 |
| Dibenzofuran | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 72 | 132-64-9 |
| Fluoranthene | 340S | | | SW846-8270C | 300 | 720 | 206-44-0 |
| Fluorene | 340S | | | SW846-8270C | 100 | 720 | 86-73-7 |
| Indeno(1,2,3-cd)Pyrene | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 0.575 | 193-39-5 |
| Naphthalene | 340S | 371S (Alumuna) | | SW846-8270C SIM | 50 | 360 | 91-20-3 |
| Phenanthrene | 340S | | | SW846-8270C | 100 | * | 85-01-8 |
| Pyrene | 340S | | | SW846-8270C | 200 | 540 | 129-00-0 |
| CHLORINATED BIPHENYL CONGENERS | | | | | pg/g ww (ppt) | pg/g ww (ppt) | |
| 3,3',4,4'-Tetrachlorobiphenyl BZ077 | | MLA-010 REV 4 07/03/02 | | Method 1668 A | 0.1 ^c | * | 32598-13-3 |
| 2,3,3',4,4'-Pentachlorobiphenyl BZ105 | | MLA-010 REV 4 07/03/02 | | Method 1668 A | 0.1 ^c | * | 32598-14-4 |
| 2,3,4,4',5-Pentachlorobiphenyl BZ114 | | MLA-010 REV 4 07/03/02 | | Method 1668 A | 0.1 ^c | * | 74472-37-0 |

Table A7-5 Tissue - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology

| Analytes | Extraction SOPs | Clean Ups SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|--|-----------------------------|----------------|----------------|-------------------|--------------------|--------------------|---------------|
| 2,3',4,4' 5-Pentachlorobiphenyl BZ118 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | † 0 1 ^c | 31508-00-6 |
| 2,3',4,4',5'-Pentachlorobiphenyl BZ123 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | * 0 1 ^c | 65510-44-3 |
| 3,3',4,4',5-Pentachlorobiphenyl BZ126 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | 0 1 ^c | 57465-28-8 |
| 2,3,3',4,4',5-Hexachlorobiphenyl BZ156 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | * | 38380-08-4 |
| 2,3,3',4,4',5'-Hexachlorobiphenyl BZ157 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | | 69782-90-7 |
| 2,3',4,4',5,5'-Hexachlorobiphenyl BZ167 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | | 52663-72-6 |
| 3,3',4,4',5,5'-Hexachlorobiphenyl BZ169 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | | 32774-16-6 |
| 2,2',3,3',4,4',5-Heptachlorobiphenyl BZ170 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | | 35065-30-6 |
| 2,2',3,4,4',5,5'-Heptachlorobiphenyl BZ180 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | | 35065-29-3 |
| 2,3,3',4,4',5,5'-Heptachlorobiphenyl BZ189 | MLA-010 REV 4 07/03/02 | | | Method 1668 A | 0 1 ^c | | 39635-31-9 |
| TETRA-OCTA-CHLORINATED DIOXINS AND FURANS^d | | | | | | pg/g ww (ppt) | pg/g ww (ppt) |
| 2,3,7,8-TCDD | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 002 ^f | 1746-01-6 |
| 2,3,7,8-TCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 028 | 51207-31-9 |
| 1,2,3,7,8-PeCDD | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 002 ^f | 40321-76-4 |
| 1,2,3,7,8-PeCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 002 ^f | 57117-41-6 |
| 2,3,4,7,8-PeCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 005 ^f | 57117-31-4 |
| 1,2,3,4,7,8-HxCDD | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 003 ^f | 39227-28-6 |
| 1,2,3,6,7,8-HxCDD | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 003 ^f | 57653-85-7 |
| 1,2,3,7,8,9-HxCDD | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 028 | 19408-74-3 |
| 1,2,3,4,7,8-HxCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 003 ^f | 70648-26-9 |
| 1,2,3,6,7,8-HxCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 003 ^f | 57117-44-9 |
| 1,2,3,7,8,9-HxCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 003 ^f | 72918-21-9 |
| 2,3,4,6,7,8-HxCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 003 ^f | 60851-34-5 |
| 1,2,3,4,6,7,8-HpCDD | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 003 ^f | 35822-46-9 |
| 1,2,3,4,6,7,8-HpCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 003 ^f | 67562-39-4 |
| 1,2,3,4,7,8,9-HpCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 003 ^e | 0 003 ^f | 55673-89-7 |
| OCDD | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 015 ^e | 0 003 ^f | 3268-87-9 |
| OCDF | DOC DX-1613B REV 7 05/07/01 | | | Method 1613 B | 0 015 ^e | 0 003 ^f | 39001-02-0 |

^a These compounds are part of technical Chlorodane. No information at this time need method development, to see if co-elutions with current analytes

^b = R&D would need to be performed to verify analysis in tissue

^c = Based on a 75g sample weight and reporting to sample detection limits of 0.2 to 0.3 pg per sample

^d = Diphenylhydrazine cannot be separated from Azobenzene using this method

^e = MRL are project specific

^f = ACG are the "goals" established by EPA from Ad Hoc meeting with LWG May 10 2002

^g = Total chlordane will be calculated off of the 5 isomers. The isomers do not have established ACGs

NA = Non-Applicable

NE = Non Established An MDL or ACG has not been established

Italic = ACG met Lab MRL below

Bold = Not able to meet with present laboratory methodology

Table A7-4 Sediment - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology (including SOPs)

| Analytes | Extraction / Digestion SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|-------------------------------|-----------------------------|-----------------|--------------------|------------------|------------------|------------|
| Conventional | | | | | | |
| Total Solids | | | EPA-160 3/SM 2540B | 0.01 % | NE | NA |
| Grain Size | | | ASTM D-422-63 | 1% | NE | NA |
| Total Organic Carbon | | | Plumb et al , 1981 | 0.005 % | NE | NA |
| Metals | | | | | | |
| Silver - Ag | 509S | | SW846-7761 GFAA | 0.02 | * 0.02 | 7782-49-2 |
| Aluminum - Al | 507S | | SW846-6010 ICP | 5.0 | 5.0 | 7429-90-5 |
| Arsenic - As | 509S | | SW846-7060A GFAA | 0.10 | 0.10 | 7440-66-6 |
| Cadmium - Cd | 509S | | SW846-7131A GFAA | 0.02 | 0.02 | 7440-43-9 |
| Chromium - Cr | 507S | | SW846-6010 ICP | 0.50 | 0.50 | 7440-47-3 |
| Copper - Cu | 507S | | SW846-6010 ICP | 0.20 | 0.20 | 7440-50-8 |
| Nickel - Ni | 507S | | SW846-6010 ICP | 1.0 | 0.50 | 7440-50-8 |
| Lead - Pb | 509S | | SW846-7421 GFAA | 0.10 | 0.10 | 7439-92-1 |
| Antimony - Sb | 507S | | SW846-7041 GFAA | 0.20 | 0.20 | 7440-36-0 |
| Selenium - Se | 509S | | SW846-7040 GFAA | 0.20 | 0.50 | 7782-49-2 |
| Zinc - Zn | 507S | | SW846-6010 ICP | 0.60 | 0.60 | 7440-66-6 |
| Mercury - Hg | 511S | | SW846-7471A CVAA | 0.05 | 0.05 | 7439-97-6 |
| Butyltins | | | | | | |
| Monobutyltin | 315S | | Krone et al | 12 | * 12 | 78763-54-9 |
| Dibutyltin | 315S | | Krone et al | 12 | * 12 | 1002-53-5 |
| Tributyltin | 315S | | Krone et al | 6.0 | 6.0 | 56573-85-4 |
| Tetrabutyltin | 315S | | Krone et al | NE ^b | * NE | 1461-25-2 |
| PCBs Aroclors | | | | | | |
| Aroclor 1016 | 359S | 345S (Florisil) | 335S (Acid) | SW846-8082 | 5.0 | * |
| Aroclor 1221 | 359S | 345S (Florisil) | 335S (Acid) | SW846-8082 | 10 | * |
| Aroclor 1232 | 359S | 345S (Florisil) | 335S (Acid) | SW846-8082 | 5.0 | * |
| Aroclor 1242 | 359S | 345S (Florisil) | 335S (Acid) | SW846-8082 | 5.0 | 0.004 |
| Aroclor 1248 | 359S | 345S (Florisil) | 335S (Acid) | SW846-8082 | 5.0 | 0.004 |
| Aroclor 1254 | 359S | 345S (Florisil) | 335S (Acid) | SW846-8082 | 5.0 | 0.004 |
| Aroclor 1260 | 359S | 345S (Florisil) | 335S (Acid) | SW846-8082 | 5.0 | 0.004 |
| CHLORINATED HERBICIDES | | | | | | |
| Dalapon | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 45 | * |
| Dicamba | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 20 | * |
| MCPA | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 10000 | * |
| Dichlorprop | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 10 | * |
| 2,4-D | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 6.6 | 2.8 |
| 2,4,5-TP (Silvex) | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 1.7 | 2.2 |
| 2,4,5-T | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 1.7 | 2.8 |
| 2,4-DB | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 45 | 2.2 |
| Dinoseb | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 20 | * |
| MCPP | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 10000 | * |
| Pentachlorophenol | 325S | 325S (BackExt) | 325S (Water wash) | SW846-8151A | 1.7 | 0.58 |

Table A7-4 Sediment - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology (including SOPs)

| Analytes | Extraction / Digestion SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|-----------------------------------|-----------------------------|-----------------|-------------------|------------------|------------------|------------|
| ORGANOCHLORINE PESTICIDES* | | | | | | |
| 2,4'-DDD | 350S | 345S (Florisil) | SW846-8081A | NE ^b | * | 53-19-0 |
| 2,4'-DDE | 350S | 345S (Florisil) | SW846-8081A | NE ^b | * | 3424-82-6 |
| 2,4'-DDT | 350S | 345S (Florisil) | SW846-8081A | NE ^b | * | 789-02-6 |
| 4,4'-DDD | 350S | 345S (Florisil) | SW846-8081A | 0.4 | 0.083 | 72-54-8 |
| 4,4'-DDE | 350S | 345S (Florisil) | SW846-8081A | 0.4 | 0.0588 | 72-55-9 |
| 4,4'-DDT | 350S | 345S (Florisil) | SW846-8081A | 0.4 | 0.0588 | 50-29-3 |
| Total DDT | | | | | * | |
| Aldrin | 350S | 345S (Florisil) | SW846-8081A | 0.2 | 0.00038 | 309-00-2 |
| a - BHC | 350S | 345S (Florisil) | SW846-8081A | 0.2 | 0.001 | 319-84-6 |
| b - BHC | 350S | 345S (Florisil) | SW846-8081A | 0.2 | 0.0036 | 319-85-7 |
| d - BHC | 350S | 345S (Florisil) | SW846-8081A | 0.2 | * | 319-86-8 |
| g - BHC (Lindane) | 350S | 345S (Florisil) | SW846-8081A | 0.2 | 0.005 | 58-89-9 |
| a - Chlordane | 350S | 345S (Florisil) | SW846-8081A | 0.2 | * | 5103-71-9 |
| g - Chlordane | 350S | 345S (Florisil) | SW846-8081A | 0.2 | * | 5103-74-2 |
| cis - nonachlor | 350S | 345S (Florisil) | SW846-8081A | NE ^b | * | 5103-73-1 |
| oxy chlordane | 350S | 345S (Florisil) | SW846-8081A | NE ^b | * | 26880-48-8 |
| trans - nonachlor | 350S | 345S (Florisil) | SW846-8081A | NE ^b | * | 39765-80-5 |
| total Chlordane ³ | | | | 1.0 | 0.057 | |
| Dieldrin | 350S | 345S (Florisil) | SW846-8081A | 0.4 | 0.0004 | 60-57-1 |
| Endosulfan I | 350S | 345S (Florisil) | SW846-8081A | 0.2 | 1.7 | 959-98-8 |
| Endosulfan II | 350S | 345S (Florisil) | SW846-8081A | 0.4 | * | 33213-65-9 |
| Endosulfan sulfate | 350S | 345S (Florisil) | SW846-8081A | 0.4 | * | 1031-07-8 |
| Endrin | 350S | 345S (Florisil) | SW846-8081A | 0.4 | 0.084 | 72-20-8 |
| Endrin aldehyde | 350S | 345S (Florisil) | SW846-8081A | 0.4 | * | 7421-93-4 |
| Endrin ketone | 350S | 345S (Florisil) | SW846-8081A | 0.4 | * | 53494-70-5 |
| Heptachlor | 350S | 345S (Florisil) | SW846-8081A | 0.2 | 0.0014 | 76-44-8 |
| Heptachlor epoxide | 350S | 345S (Florisil) | SW846-8081A | 0.2 | 0.0007 | 1024-57-3 |
| Hexachlorobenzene | 350S | 345S (Florisil) | SW846-8081A | 1.0 | 0.33 | 118-74-1 |
| Hexachlorobutadiene | 350S | 345S (Florisil) | SW846-8081A | 1.0 | 0.6 | 87-68-3 |
| Hexachloroethane | 350S | 345S (Florisil) | SW846-8081A | 1.0 | 2.0 | 67-72-1 |
| Methoxychlor | 350S | 345S (Florisil) | SW846-8081A | 2.0 | 1.4 | 72-43-5 |
| mirex | 350S | 345S (Florisil) | SW846-8081A | NE ^b | 0.056 | 2385-85-5 |
| Toxaphene | 350S | 345S (Florisil) | SW846-8081A | 100 | 0.0059 | 8001-35-2 |
| VOLATILE ORGANIC COMPOUNDS | | | | | | |
| 1,1,1,2-Tetrachloroethane | | | SW846-8260B | 1.0 | 1.0 | 630-20-6 |
| 1,1,1-Trichloroethane | | | SW846-8260B | 1.0 | 1.0 | 71-55-6 |
| 1,1,2,2-Tetrachloroethane | | | SW846-8260B | 1.0 | 1.0 | 79-34-5 |
| 1,1,2-Trichloroethane | | | SW846-8260B | 1.0 | 1.0 | 79-00-5 |
| 1,1-Dichloroethane | | | SW846-8260B | 1.0 | 1.0 | 75-34-3 |
| 1,1-Dichloroethene | | | SW846-8260B SIM | 0.1 | 0.1 | 75-35-4 |
| 1,2,3-Trichloropropane | | | SW846-8260B | 3.0 | 3.0 | 96-18-4 |
| 1,2-Dichloroethane | | | SW846-8260B | 1.0 | 1.0 | 107-06-2 |
| 1,2-Dichloropropane | | | SW846-8260B | 1.0 | 1.0 | 78-87-5 |
| 2-Butanone | | | SW846-8260B | 5.0 | 5.0 | 78-93-3 |
| 2-Chloroethyl Vinyl Ether | | | SW846-8260B | 5.0 | 5.0 | 110-75-8 |

DRAFT DOCUMENT - DO NOT QUOTE OR CITE

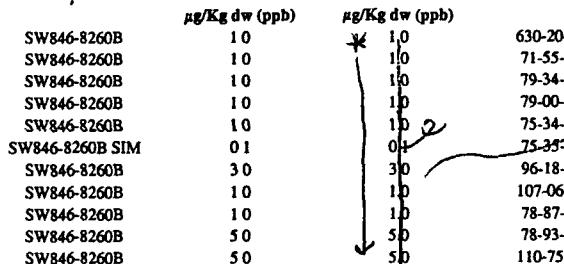


Table A7-4 Sediment - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology (including SOPs)

| Analytes | Extraction / Digestion SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|--|-----------------------------|----------------|-------------------|------------------|------------------|-------------------|
| 2-Hexanone | | | SW846-8260B | 50 | 50 | 591-78-6 |
| 4-Methyl-2-Pentanone | | | SW846-8260B | 50 | 50 | 108-10-1 |
| Acetone | | | SW846-8260B | 50 | 50 | 67-64-1 |
| Acrolein | | | SW846-8260B | 50 | 50 | 107-02-8 |
| Acrylonitrile | | | SW846-8260B | 50 | 50 | 107-13-1 |
| Benzene | | | SW846-8260B SIM | 0.11 | 0.1 | 71-43-2 |
| Bromoform | | | SW846-8260B | 10 | 10 | 74-97-5 |
| Bromochloromethane | | | SW846-8260B | 10 | 10 | 75-27-4 |
| Bromodichloromethane | | | SW846-8260B | 20 | 20 | 598-31-2 |
| Bromoethane | | | SW846-8260B | 10 | 10 | 75-25-2 |
| Bromoform | | | SW846-8260B | 10 | 10 | 74-83-9 |
| Bromomethane | | | SW846-8260B | 10 | 10 | 75-15-0 |
| Carbon Disulfide | | | SW846-8260B | 10 | 10 | 56-23-5 |
| Carbon Tetrachloride | | | SW846-8260B | 10 | 10 | 108-90-7 |
| Chlorobenzene | | | SW846-8260B | 10 | 10 | 124-48-1 |
| Chlorodibromomethane | | | SW846-8260B | 10 | 10 | 75-00-3 |
| Chloroethane | | | SW846-8260B | 10 | 10 | 67-66-3 |
| Chloroform | | | SW846-8260B | 10 | 10 | 74-87-3 |
| Chloromethane | | | SW846-8260B | 10 | 10 | 10061-01-5 |
| cis - 1,3-Dichloropropene | | | SW846-8260B | 10 | 10 | 74-95-3 |
| Dibromomethane | | | SW846-8260B | 10 | 10 | 75-71-8 |
| Dichlorodifluoromethane | | | SW846-8260B | 10 | 10 | 100-41-4 |
| Ethyl Benzene | | | SW846-8260B SIM | 0.11 | 0.11 | 87-68-3 |
| Hexachloro-1,3-Butadiene | | | SW846-8260B | 50 | 50 | 74-88-4 |
| Iodomethane | | | SW846-8260B | 10 | 10 | 98-82-8 |
| Isopropyl Benzene | | | SW846-8260B SIM | 0.22 | 0.22 | 108-38-3/106-42-3 |
| m,p-Xylene | | | SW846-8260B | 20 | 20 | 75-09-2 |
| Methylene Chloride | | | SW846-8260B SIM | 0.11 | 0.11 | 80-62-6 |
| Methyl-t-butyl ether (MTBE) | | | SW846-8260B | 50 | 50 | 91-20-3 |
| Naphthalene | | | SW846-8260B | 50 | 50 | 95-47-6 |
| o-Xylene | | | SW846-8260B SIM | 0.11 | 0.11 | 100-42-5 |
| Styrene | | | SW846-8260B | 10 | 10 | 127-18-4 |
| Tetrachloroethene | | | SW846-8260B SIM | 0.1 | 0.1 | 108-88-3 |
| Toluene | | | SW846-8260B SIM | 0.11 | 0.11 | 156-50-5 |
| trans - 1,2-Dichloroethene | | | SW846-8260B | 10 | 10 | 10061-02-6 |
| trans - 1,3-Dichloropropene | | | SW846-8260B | 10 | 10 | 110-57-6 |
| trans - 1,4-Dichloro-2-Butene | | | SW846-8260B | 50 | 50 | 79-01-6 |
| Trichloroethene | | | SW846-8260B SIM | 0.1 | 0.1 | 75-69-4 |
| Trichlorofluoromethane | | | SW846-8260B | 10 | 10 | 108-05-4 |
| Vinyl Acetate | | | SW846-8260B | 50 | 50 | 75-01-4 |
| Vinyl Chloride | | | SW846-8260B SIM | 0.1 | 0.1 | |
| SEMICVOLATILE ORGANIC COMPOUNDS Full Scan | | | | | | |
| 2,2'-oxybis(1-chloropropane) | 374S | | SW846-8270C | 40 | * | 108-60-1 |
| 2-Chloronaphthalene | 374S | | SW846-8270C | 20 | * | 91-58-7 |
| 2-Nitroaniline | 374S | | SW846-8270C | 20 | * | 88-74-4 |
| 3,3'-Dichlorobenzidine | 374S | | SW846-8270C | 20 | * | 91-94-1 |

Table A7-4 Sediment - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology (including SOPs)

| Analytes | Extraction / Digestion SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|--|-----------------------------|----------------|-------------------|------------------|----------------------|------------|
| 3-Nitroaniline | 374S | | SW846-8270C | 20 | • | 99-09-2 |
| 4-Nitroaniline | 374S | | SW846-8270C | 40 | • | 100-01-6 |
| Aniline | 374S | | SW846-8270C | 100 | • | 62-53-3 |
| Benzoic Acid | 374S | | SW846-8270C | 200 | • | 65-85-0 |
| Benzyl Alcohol | 374S | | SW846-8270C | 20 | • | 100-51-6 |
| Bis-(2-chloroethoxy) methane | 374S | | SW846-8270C | 100 | • | 111-91-1 |
| Hexachlorocyclopentadiene | 374S | | SW846-8270C | 20 | • | 77-47-4 |
| Isophorone | 374S | | SW846-8270C | 20 | • | 78-59-1 |
| n-Nitrosodimethylamine | 374S | | SW846-8270C | 20 | 0 0073 | 62-75-9 |
| n-Nitroso-di-n-propylamine | 374S | | SW846-8270C | 20 | 0 053 | 621-64-7 |
| n-Nitrosodiphenylamine | 374S | | SW846-8270C | 20 | • | 86-30-6 |
| Phenols | | | | µg/Kg dw (ppb) | µg/Kg dw (ppb) | |
| 2,3,4,6-Tetrachlorophenol | 374S | | SW846-8270C | 100 | 100 ^a 157 | 58-90-2 |
| 2,4,5-trichlorophenol | 374S | | SW846-8270C | 4 93 | 580 ^a 524 | 95-95-4 |
| 2,4,6-trichlorophenol | 374S | | SW846-8270C | 5 91 | 1 8 | 88-06-2 |
| 2,4-Dichlorophenol | 374S | | SW846-8270C | 20 | 16 | 120-83-2 |
| 2,4-Dimethylphenol | 374S | | SW846-8270C | 20 | • | 105-67-9 |
| 2,4-Dinitrophenol | 374S | | SW846-8270C | 20 | • | 51-28-5 |
| 2-Chlorophenol | 374S | | SW846-8270C | 40 | 26 | 95-57-8 |
| 2-Methylphenol | 374S | | SW846-8270C | 20 | • | 95-48-7 |
| 2-Nitrophenol | 374S | | SW846-8270C | 100 | • | 88-75-5 |
| 4,6-Dinitro-2-Methylphenol | 374S | | SW846-8270C | 200 | • | 534-52-1 |
| 4-Chloro-3-methylphenol | 374S | | SW846-8270C | 20 | • | 59-50-7 |
| 4-Methylphenol | 374S | | SW846-8270C | 20 | 26 | 106-44-5 |
| 4-Nitrophenol | 374S | | SW846-8270C | 20 | • | 100-02-7 |
| Phenol | 374S | | SW846-8270C | 100 | 3146 | 108-95-2 |
| Tetrachlorophenol (2,3,4,5 and 2,3,5,6) | 374S | | SW846-8270C | NE ^b | 157 | 25167-83-3 |
| Phthalate esters | | | | µg/Kg dw (ppb) | µg/Kg dw (ppb) | |
| bis(2-Ethyhexyl) phthalate | 374S | | SW846-8270C | 20 | 3 4 | 117-81-7 |
| Butylbenzylphthalate | 374S | | SW846-8270C | 100 | 400 | 85-68-7 |
| Diethylphthalate | 374S | | SW846-8270C | 20 | • | 84-66-2 |
| Dimethylphthalate | 374S | | SW846-8270C | 20 | 20000 | 131-11-3 |
| Di-n-butylphthalate | 374S | | SW846-8270C | 20 | 204 | 84-74-2 |
| Di-n-octylphthalate | 374S | | SW846-8270C | 20 | 40 9 | 117-84-0 |
| 1,2,4-Trichlorobenzene | 374S | | SW846-8270C | 20 | • | 120-82-1 |
| 1,2-Dichlorobenzene | 374S | | SW846-8270C | 20 | 184 | 95-50-1 |
| 1,3-Dichlorobenzene | 374S | | SW846-8270C | 20 | • | 541-73-1 |
| 2,4-Dinitrotoluene | 374S | | SW846-8270C | 20 | • | 121-14-2 |
| 2,6-Dinitrotoluene | 374S | | SW846-8270C | 20 | • | 606-20-2 |
| 4-bromophenyl-phenyl ether | 374S | | SW846-8270C | 60 | • | 101-55-3 |
| 4-Chloroaniline | 374S | | SW846-8270C | 20 | • | 106-47-8 |
| 4-Chlorophenyl-phenyl ether | 374S | | SW846-8270C | 60 | • | 7005-72-3 |
| Bis-(2-chloroethyl) ether | 374S | | SW846-8270C | 20 | • | 111-44-4 |
| Hexachloroethane | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 0 7 ^c | 34 20 | 67-72-1 |
| Nitrobenzene | 374S | | SW846-8270C | 20 | • | 98-95-3 |
| SEMOVOLATILE ORGANIC COMPOUNDS SIMs | | | | µg/kg ww (ppb) | µg/kg ww (ppb) | |

Table A7-4 Sediment - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology (including SOPs)

| Analytes | Extraction / Digestion SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|--|-----------------------------|----------------|-------------------|------------------|------------------|------------|
| 1,2-diphenylhydrazine ^f | 374S | 371S (Alumina) | SW846-8270C SIM | 20 | 0 0025 | |
| 1,4-Dichlorobenzene | 374S | | SW846-8270C | 20 | 20 | 106-46-7 |
| Hexachlorobenzene | 374S | | SW846-8270C | 20 | 0 3 | 118-74-1 |
| Hexachlorobutadiene | 374S | | SW846-8270C | 100 | 0 6 | 87-68-3 |
| Pentachlorophenol | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 3 5 | 0 58 | 87-86-5 |
| PAHs | | | | µg/Kg dw (ppb) | µg/Kg dw (ppb) | |
| 2-Methylnaphthalene | 374S | | SW846-8270C | 20 | * | 91-57-6 |
| Acenaphthene | 374S | | SW846-8270C | 100 | 72 | 83-32-9 |
| Acenaphthylene | 374S | | SW846-8270C | 100 | * | 208-96-8 |
| Anthracene | 374S | | SW846-8270C | 20 | 360 | 120-12-7 |
| Benz(a)Anthracene | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 0 7 ^c | 0 038 | 56-55-3 |
| Benz(a)Pyrene | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 0 7 ^c | 0 0038 | 50-32-8 |
| Benz(b)Fluoranthene | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 0 7 ^c | 0 038 | 205-99-2 |
| Benz(glu)Perylene | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 120 | * | 191-24-2 |
| Benz(k)Fluoranthene | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 0 7 ^c | 0 38 | 207-08-9 |
| Carbazole | 374S | | SW846-8270C | NE ^b | 6 12 | 86-74-8 |
| Chrysene | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 0 7 ^c | 3 8 | 218-01-9 |
| Dibenzofuran | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 0 7 ^c | 8 2 | 132-64-9 |
| Dibenzo(a,h)Anthracene | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 0 7 ^c | 0 0038 | 53-70-3 |
| Fluoranthene | 374S | | SW846-8270C | 20 | 48 | 206-44-0 |
| Fluorene | 374S | | SW846-8270C | 20 | 48 | 86-73-7 |
| Indeno(1,2,3-cd)Pyrene | 374S (371S) | 371S (Alumina) | SW846-8270C SIM | 0 7 ^c | 0 038 | 193-39-5 |
| Naphthalene | 374S | | SW846-8270C | 20 | 24 | 91-20-3 |
| Phenanthrene | 374S | | SW846-8270C | 20 | * | 85-01-8 |
| Pyrene | 374S | | SW846-8270C | 20 | 36 | 129-00-0 |
| CHLORINATED BIPHENYL CONGENERS ^d | | | | pg/g dw (ppt) | pg/g dw (ppt) | |
| 3,3',4,4'-Tetrachlorobiphenyl BZ077 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 32598-13-3 |
| 2,3,3',4,4'-Pentachlorobiphenyl BZ105 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 32598-14-4 |
| 2,3,4,4',5-Pentachlorobiphenyl BZ114 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 74472-37-0 |
| 2,3',4,4',5-Pentachlorobiphenyl BZ118 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 31508-00-6 |
| 2,3',4,4',5'-Pentachlorobiphenyl BZ123 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 65510-44-3 |
| 3,3',4,4',5-Pentachlorobiphenyl BZ126 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 57465-28-8 |
| 2,3,3',4,4',5-Hexachlorobiphenyl BZ156 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 38380-08-4 |
| 2,3,3',4,4',5'-Hexachlorobiphenyl BZ157 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 69782-90-7 |
| 2,3',4,4',5,5'-Hexachlorobiphenyl BZ167 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 52663-72-6 |
| 3,3',4,4',5,5'-Hexachlorobiphenyl BZ169 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 32774-16-6 |
| 2,2',3,3',4,4',5-Hepatachlorobiphenyl BZ170 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 35065-30-6 |
| 2,2',3,4,4',5,5'-Heptachlorobiphenyl BZ180 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 35065-29-3 |
| 2,3,3',4,4',5,5'-Heptachlorobiphenyl BZ189 | MLA-010 REV 4 07/03/02 | | Method 1668A | 0 5-1 0 | 0 510 | 39635-31-9 |
| TETRA-OCTA-CHLORINATED DIOXINS AND FURANS ^e | | | | pg/g dw (ppt) | pg/g dw (ppt) | |
| 2,3,7,8-TCDD | DOC DX-1613B REV 7 05/07/01 | | Method 1613B | 0 01 | 0.005 0.001 | 1746-01-6 |
| 2,3,7,8-TCDF | DOC DX-1613B REV 7 05/07/01 | | Method 1613B | 0 01 | 0.003 0.001 | 51207-31-9 |
| 1,2,3,7,8-PeCDD | DOC DX-1613B REV 7 05/07/01 | | Method 1613B | 0 01 | 0.003 0.001 | 40321-76-4 |
| 1,2,3,7,8-PeCDF | DOC DX-1613B REV 7 05/07/01 | | Method 1613B | 0 01 | 0.003 0.001 | 57117-41-6 |
| 2,3,4,7,8-PeCDF | DOC DX-1613B REV 7 05/07/01 | | Method 1613B | 0 01 | 0.003 0.002 | 57117-31-4 |

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Table A7-4 Sediment - Project Specific Method Reporting Limits, Analytical Concentration Goals, and Methodology (including SOPs)

| Analytes | Extraction / Digestion SOPs | Clean Ups SOPs | Analytical Method | MRL ¹ | ACG ² | CAS# |
|---------------------|-----------------------------|----------------|-------------------|-------------------|------------------|------|
| 1,2,3,4,7,8-HxCDD | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.01 | 0.003 0.01 | 39227-28-6 | |
| 1,2,3,6,7,8-HxCDD | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.01 | 0.003 0.01 | 57653-85-7 | |
| 1,2,3,7,8,9-HxCDD | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.01 | 0.003 0.01 | 19408-74-3 | |
| 1,2,3,4,7,8-HxCDF | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.01 | 0.003 0.01 | 70648-26-9 | |
| 1,2,3,6,7,8-HxCDF | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.01 | 0.003 0.01 | 57117-44-9 | |
| 1,2,3,7,8,9-HxCDF | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.01 | 0.003 0.01 | 72918-21-9 | |
| 2,3,4,6,7,8-HxCDF | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.01 | 0.003 0.01 | 60851-34-5 | |
| 1,2,3,4,6,7,8 HpCDD | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.03 | 0.003 0.09 | 35822-46-9 | |
| 1,2,3,4,6,7,8-HpCDF | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.03 | 0.003 0.09 | 67562-39-4 | |
| 1,2,3,4,7,8,9-HpCDF | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.03 | 0.003 0.09 | 55673-89-7 | |
| OCDD | DOC DX-1613B REV 7 05/07/01 | Method 1613B | 0.05 | 0.003 9-4 | 3268-87-9 | |
| OCDF | DOC DX-1613B REV 7 05/07/01 | Method 1613 B | 0.05 | 0.003 9-4 | 39001-02-0 | |

^a = Sample amount extracted 25 grams with a final extract volume of 1 ml

^b = R&D would need to be performed

^c = Estimation based off "clean sediment"

^d = 10 g sample weight

^e = 50g sample weight

^f = Normal sediments have higher results for the Octa then do they for the Tetra congeners. With the 0.003 ug/kg MRL established by EPA, a larger sample size must be used. This pushes the Octa congeners (which are usually highly detected) to the upper calibration limit of the instrument. Therefore the sediments would have to be extracted twice (one larger one smaller) to achieve the desired

^g = Diphenylhydrazine cannot be separated from Azobenzene using this method

¹ = MRL are project specific

² = ACG are the "goals" established by EPA from Ad Hoc meeting with LWG May 10, 2002

³ = Total chlordane will be calculated off of the 5 isomers. The isomers do not have established ACGs

Bold = ACG not met with present laboratory methodology

***** = ACG not established by EPA lab limit acceptable

NA = Non-Applicable

NE = Non-Established An ACG has not been established

ARI is testing the 25g down to 1ml